



HEXACHLORO-CYCLOHEXANES

CAS # 319-84-6, 319-85-7, 319-86-8, 58-89-9

Agency for Toxic Substances and Disease Registry ToxFAQs

June 1999

This fact sheet answers the most frequently asked health questions (FAQs) about hexachlorocyclohexanes. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to hexachlorocyclohexanes happens mostly from eating contaminated foods or by breathing contaminated air in the workplace. Exposure to high levels of hexachlorocyclohexanes can cause blood disorders, dizziness, headaches; seizures, and changes in the levels of sex hormones. These substances have been found in at least 144 of the 1,467 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What are hexachlorocyclohexanes?

(Pronounced hěks'ə-klōr'ō-sī'klō'hěks'ān)

Hexachlorocyclohexanes (HCH) are a group of manufactured chemicals that do not occur naturally in the environment. HCH has eight chemical forms (called isomers). The four most common are alpha-, beta-, gamma, and delta-HCH. The most common of these is gamma-HCH (also known as lindane). Lindane is a white solid substance that may evaporate into the air as a colorless vapor with a slightly musty odor. It is the common form of hexachlorocyclohexane.

Lindane was used as an insecticide on fruit and vegetable crops (including greenhouse vegetables and tobacco) and forest crops (including Christmas trees). It is still used in ointments to treat head and body lice, and scabies.

Lindane has not been produced in the United States since 1977. It is still imported to and formulated in the United States.

What happens to hexachlorocyclohexanes when they enter the environment?

- ☐ In air, HCH can be present as a vapor or attached to small particles such as soil or dust.
- ☐ Lindane can remain in the air for up to 17 weeks and travel long distances.

- ☐ Particles with attached HCH may be removed from the air by rain.
- ☐ In soil, sediments, and water, it is broken down by algae, fungi, and bacteria to less harmful substances.
- ☐ HCH isomers are broken down quickly in water; lindane does not remain in water longer than 30 days.
- ☐ The length of time that HCH isomers remain in soil is not known.
- ☐ It can accumulate in the fatty tissue of fish.

How might I be exposed to hexachlorocyclohexanes?

- ☐ Eating contaminated foods, such as plants, meat, and milk.
- ☐ Breathing contaminated air in or near factories where products using HCH are made.
- ☐ Through skin when applied as a lotion or shampoo to control lice and scabies.
- ☐ Drinking contaminated water or breathing contaminated air near waste sites or landfills.

How can hexachlorocyclohexanes affect my health?

Some people who breathed contaminated workplace air during the manufacturing of pesticides, including lindane,

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had blood disorders, dizziness, headaches, and changes in the levels of sex hormones. Some people who swallowed large amounts had seizures and sometimes died.

Animals fed high levels of HCH had convulsions and some became comatose. Liver and kidney effects and a reduced ability to fight infections occurred at moderate levels.

Animal showed a decreased ability to reproduce when they were fed moderate to high levels of HCH.

How likely are hexachlorocyclohexanes to cause cancer?

The Department of Health and Human Services (DHHS) has determined that HCH may reasonably be anticipated to be a carcinogen. Liver cancer has been seen in laboratory rodents that ate HCH for a long period of time.

How can hexachlorocyclohexanes affect children?

There are no studies on the effects of HCH on children. It is not known whether HCH can cause birth defects in people. Animal studies have not shown birth defects in the babies of animals fed HCH during pregnancy. HCH has been detected in human breast milk.

How can families reduce the risk of exposure to hexachlorocyclohexanes?

If you work with HCH, take all safety precautions to avoid bringing the dust home on your clothing. If you use products containing HCH, follow directions for use carefully. Make sure that you keep it in tightly covered containers and store the containers safely where children cannot reach them. Always store chemicals in the original labeled containers. Do not store HCH in containers that children would find attractive to eat or drink from, such as soda bottles.

Is there a medical test to show whether I've been exposed to hexachlorocyclohexanes?

Laboratory tests can measure HCH in blood, urine, and semen. These tests do not tell you how much HCH you've been exposed to or if harmful effects will occur. The tests are not routinely available at your doctor's office.

Has the federal government made recommendations to protect human health?

The EPA has set a limit in drinking water of 0.2 parts of lindane per billion parts of water (0.2 ppb). The EPA requires that spills or accidental discharges of lindane into the environment of 1 pound or more must be reported to the EPA.

The Occupational Safety and Health Administration (OSHA), the National Institute for Occupational Safety and Health (NIOSH), and the American Conference of Governmental Industrial Hygienists (ACGIH) recommend a maximum level of 0.5 milligrams lindane per cubic meter (0.5 mg/m³) of workplace air for an 8-hour workday, 40-hour workweek. These agencies advise avoiding eye and skin contact because this may be a route of significant exposure.

Source of information

Agency for Toxic Substances and Disease Registry (ATSDR) 1999. Toxicological profile for alpha-, beta-, gamma-, and delta-hexachlorocyclohexane. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Animal testing is sometimes necessary to find out how toxic substances might harm people and how to treat people who have been exposed. Laws today protect the welfare of research animals and scientists must follow strict guidelines.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop E-29, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 404-639-6359. ToxFAQs Internet address via WWW is <http://www.atsdr.cdc.gov/toxfaq.html> ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

